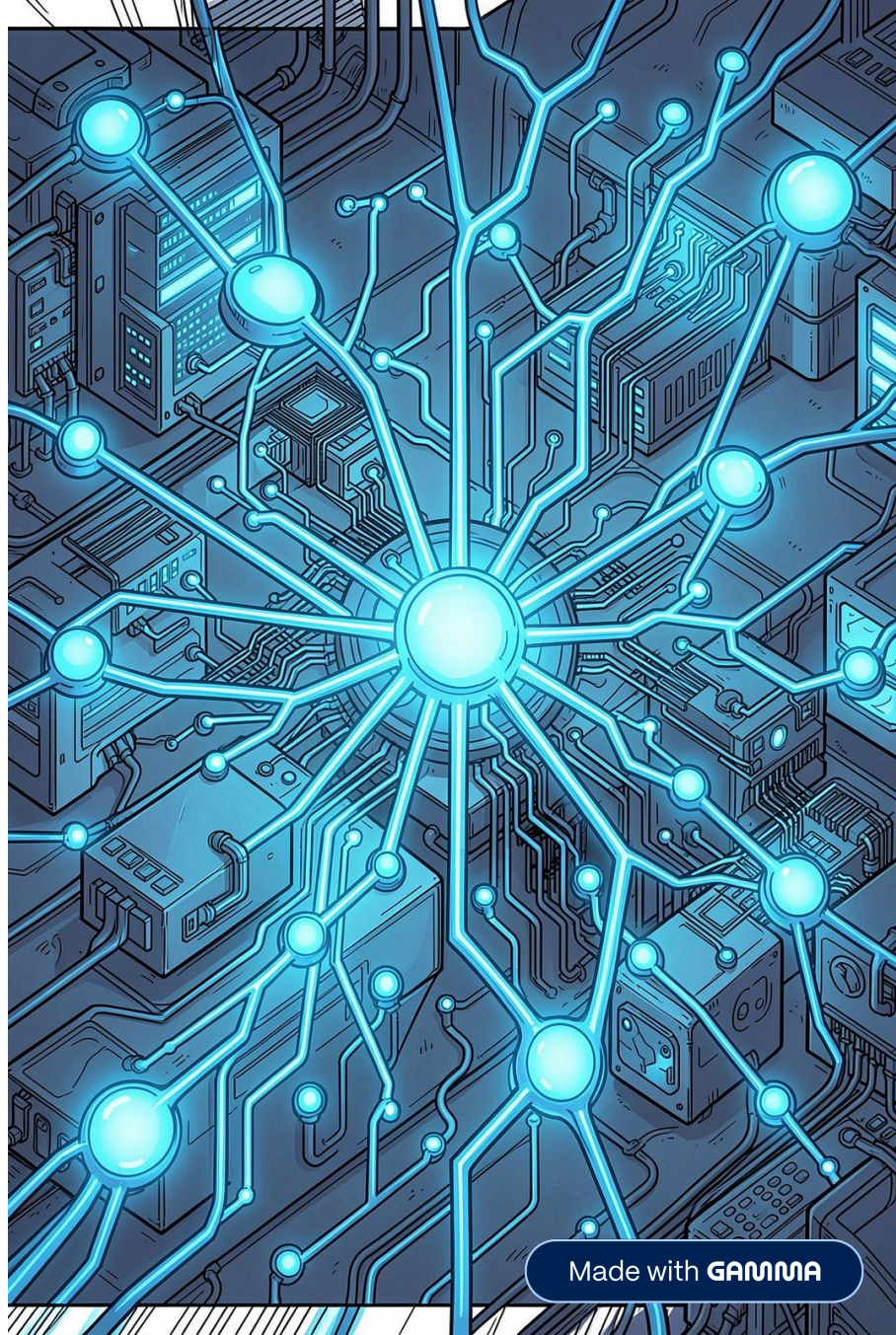
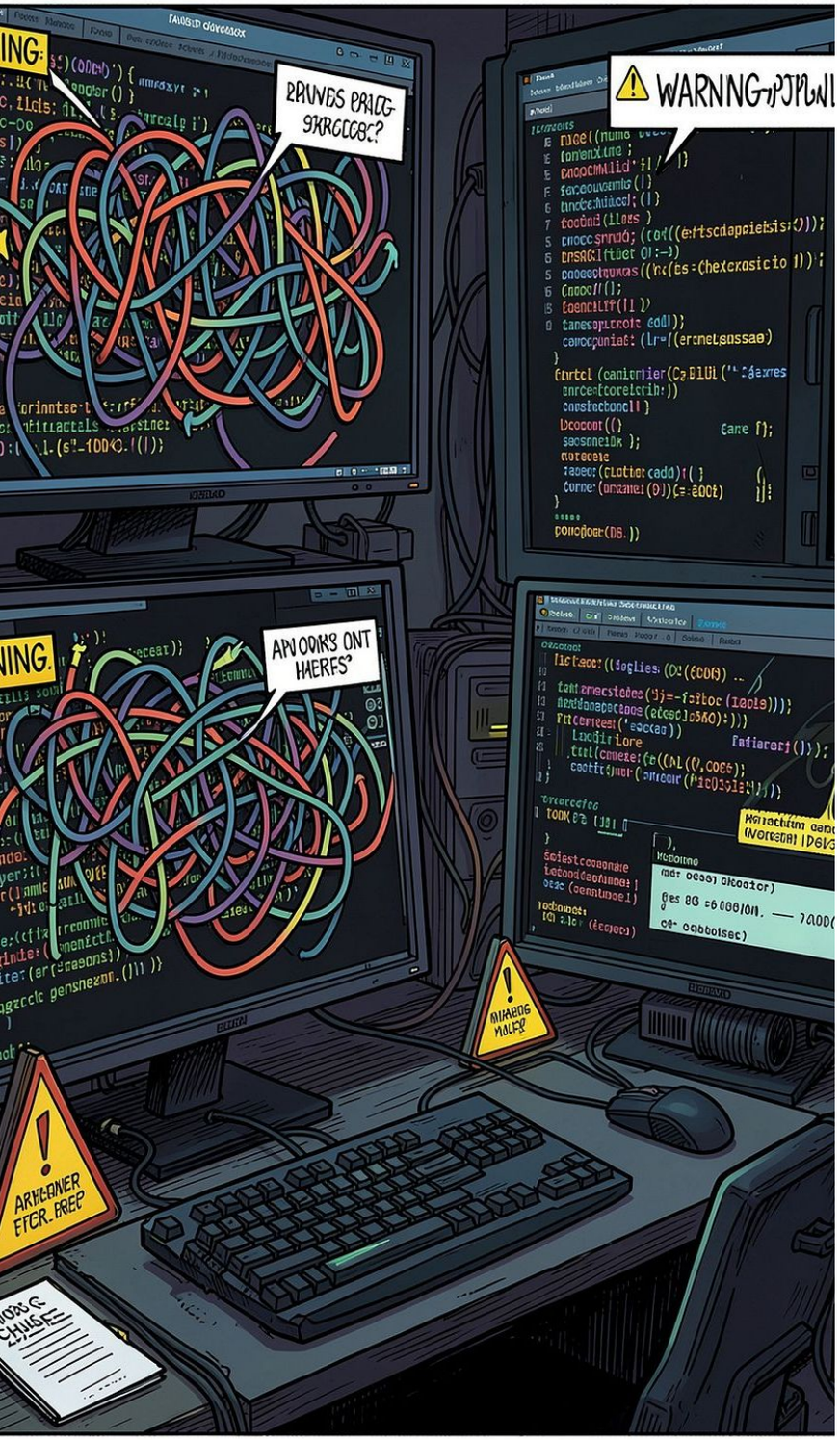
AI ENGINEERING MODERN DEV WORKFLOW

Reliable AI Systems

Building Reliable Systems with Spec-Driven Development & Loop Engineering

Moving from **"Vibe Coding"** to predictable AI execution with clearer structure, stronger feedback loops, and more confidence in delivery.





MODERN AI ENGINEERING

The Problem with Pure Prompting & "Vibe Coding"

Ad-hoc AI prompting works in short bursts — but breaks down at scale. Without structure, AI-driven development becomes unpredictable and error-prone.

Context Rot

Long chat sessions degrade AI coherence, causing hallucinations and inconsistent outputs over time.

No Architecture Boundaries

Unpredictable outputs emerge when there are no locked requirements or structural constraints.

Integration Errors Spike

Ad-hoc prompts skip validation steps, leading to compounding failures across the codebase.

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SPEC-DRIVEN DEVELOPMENT

What Spec-Driven Development Provides

Locked requirements. Clear architecture. Predictable AI output.

Single Source of Truth

Requirements and architecture are locked **before** any code generation begins — eliminating ambiguity at the source.

70% Reduction in Integration Errors

Predictable, verifiable AI execution dramatically cuts downstream integration failures.

Proven Ecosystem Methods

Frameworks like **Spec Kit** and **GSD (Get shit Done)** operationalize this approach for real engineering teams.

Modern spec-driven workflows create cleaner handoffs between planning, generation, and validation.

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MODERN AGENTIC WORKFLOW

SPEC-DRIVEN

GSD Core: Benefits Over Spec Kit

Structured Prompt

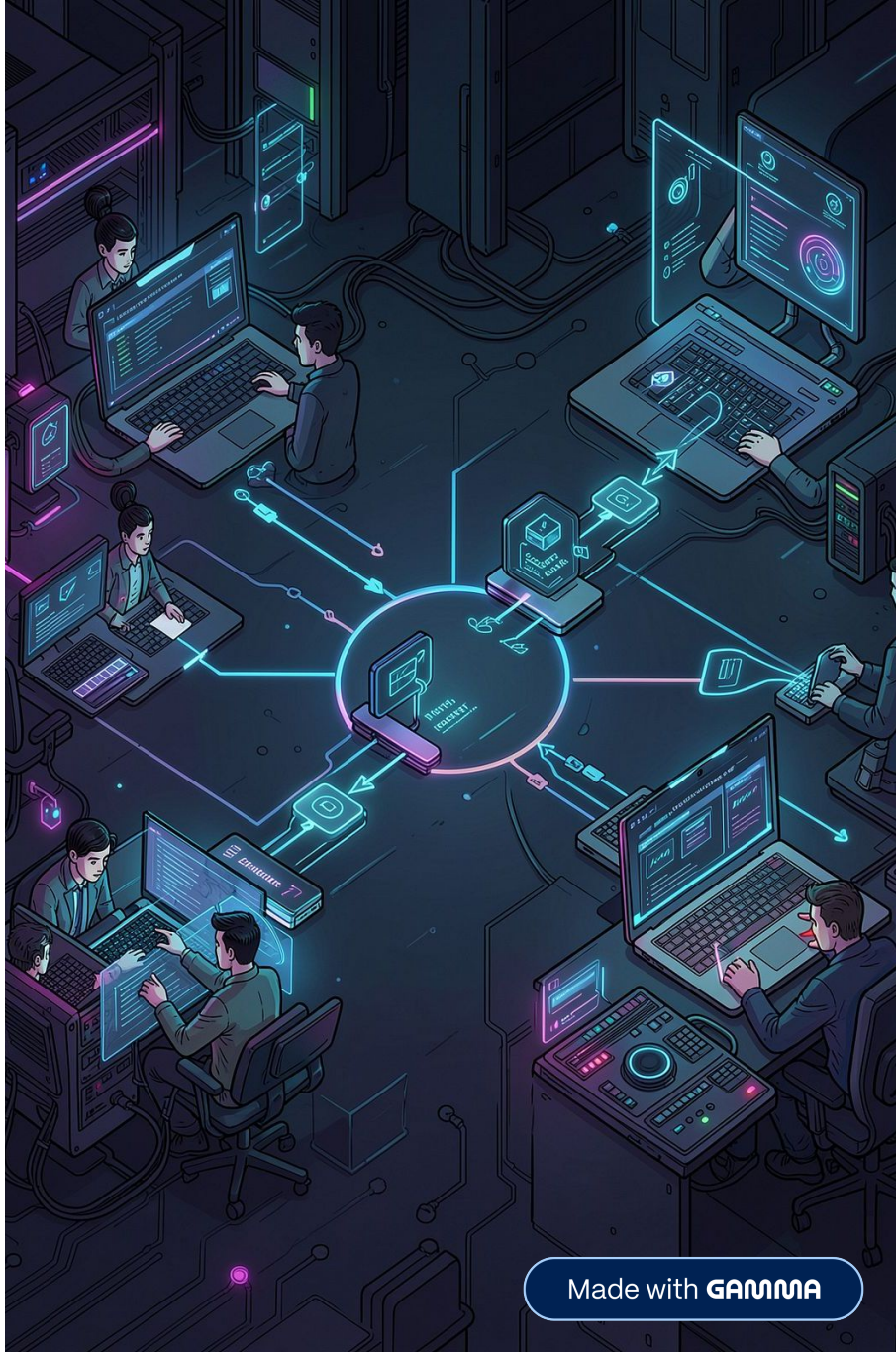
Uses explicit slash commands and prompt templates to enforce granular permissions, scopes, and task goals at every phase.

Context Isolation

Runs heavy research and implementation in fresh-context sub-agents while keeping the main terminal session extremely lean (~30% tokens).

Agent Harness

Orchestrates parallel worker execution, atomic git commits, deterministic tools, and automated verification hooks.



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GSD WORKFLOW MODERNIZED

The GSD Command Flow & Workspace

Structured commands, clearer milestones, and lean execution across isolated sub-agents.

1

Setup

`/gsd-new-project`

Creates `.planning/{PROJECT, REQUIREMENTS, ROADMAP}.md`

2

Discuss

`/gsd-discuss-phase`

Creates `.planning/phases/{N}-CONTEXT.md`

3

Plan

`/gsd-plan-phase`

Spawns a research sub-agent → `.planning/phases/{N}-PLAN.md`

4

Execute

`/gsd-execute-phase`

Isolated sub-agents make atomic git commits

5

Verify & Ship

`/gsd-verify-work` & `/gsd-ship-phase`

Generates `VERIFICATION.md` & PR

Main session stays lean (~30% tokens) while background sub-agents handle heavy research and execution in fresh contexts.

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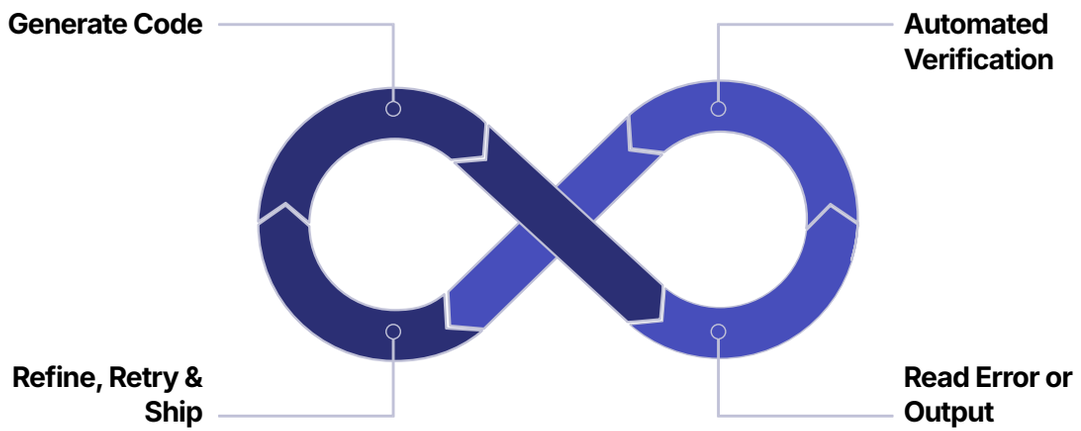
LOOP ENGINEERING | VERIFICATION | AUTOMATION

What it does

Loop Engineering is an automated process where AI verifies, improves, and retries its work until it satisfies the **Definition of Done (DoD)**.

Custom loops are tailored to your project's specific DoD — test suites, linter checks, visual regression, or any combination.

> Designed to reduce manual review cycles while keeping quality gates strict.



Automated feedback keeps the loop tight: every failure becomes input for the next refinement pass.

01

Verify

Automated gates replace manual review cycles.

02

Self-correct

AI uses structured error output to improve the result.

03

Ship

Release only when every DoD criterion is satisfied.

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Thank You...